

We Claim:

1. A method of making an optical waveguide in a substrate material comprising

a) forming an opening in said substrate,

b) depositing a first cladding layer conformally in said opening,

c) filling said opening with a core material;

d) removing excess core material, and

e) depositing a second cladding layer over the substrate.

2. A method according to claim 1 wherein said substrate is selected from the group consisting of silicon, silicon-germanium, gallium arsenide, indium gallium arsenide and indium phosphide.

3. A method according to claim 2 wherein said substrate is silicon.

4. A method according to claim 3 wherein said first and second cladding layers are of silicon oxide each having a different refractive index.

5. A method according to claim 1 wherein excess core material is removed by chemical mechanical polishing.

6. A method of making an optical waveguide in a silicon-containing substrate having a layer of silicon nitride and a layer of silicon oxide thereon comprising

a) masking and patterning an opening in said mask,

b) etching through the silicon oxide and silicon nitride layers to form a hard mask,

c) etching an opening in said substrate,

d) conformally depositing a first cladding layer of silicon oxide in said opening,

e) filling said opening with a core material having a different refractive index than said first cladding layer;

f) planarizing the core and first cladding layer to remove said silicon oxide layer,

g) etching said silicon nitride layer, and

h) depositing a second cladding layer having a different refractive index than the core material and the first cladding layer.

7. A method according to claim 6 wherein said substrate is silicon.

8. A method according to claim 6 wherein said substrate is silicon on insulator.